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THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 164

LATE BLIGHT ON POTATO
AND TOMATO IN 1946

Supplement 164 July 15, 1946

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

LATE BLIGHT ON POTATO AND TOMATO IN 1946

Plant Disease Reporter
Supplement 164 July 15, 1946

FOREWORD

Reports that late blight (Phytophthora infestans) was appearing to an alarming extent were received from several commercial tomato-growing areas. With the aim of presenting a systematic and timely account of the development of the disease this year on its two important hosts, the Survey asked its collaborators in States where late blight is likely to occur to send reports of its incidence on either or both potato and tomato, especially as to the following points:

1. Has the disease occurred on either host and to what extent?
2. What control measures, if any, have been taken?
3. When was the disease first noted, and what in your opinion was the original source of infection?

The answers to this request, except for a few negative replies, are given below. Together with reports from various Florida sections that have appeared in each number of the Reporter, from December of last year to the current issue, they give a rather complete story of the occurrence of the disease to about the middle of June this year.

Some of the factors brought out in the reports may be briefly indicated:

Weather has been unusually favorable for late blight development over a long period of time and over a widespread area. (See Figure 1, 2, 3, 4, and 5.)

The disease is reported as appearing much earlier in several States this year than previously.

The reports from State pathologists and collaborators as to original source of infection raise an interesting question of reciprocal responsibility. Northern-grown potato seed is implicated as a source of infection for potatoes in southern areas and for potato and tomato in some Middle Atlantic States. Infection of tomato in some southern States is believed to have resulted from windblown inoculum, and in one case from infected plants, from even farther South. In most, though not all, northern tomato areas the source is given as southern-grown plants; in some cases these are believed to be the source of inoculum for both tomato and potato. In one State, however, plants were not known to have been brought from an outside source until after the disease had already been noted.

Figures 1 to 5. Summary representations of weather, February to June 1946. Figure 1, February; Figure 2, March; Figure 3, April; Figure 4, May; Figure 5, June. Maps are combinations of the maps showing departure from normal temperature and percentage of normal precipitation, from the Weather Bureau Weekly Weather and Crop Bulletin.

Unshaded: Temperature and precipitation both below normal (Cd)

..... Temperature above, precipitation below normal (Wd)

/// Temperature below, precipitation above normal (Cw)

Temperature and precipitation both above normal (Ww)

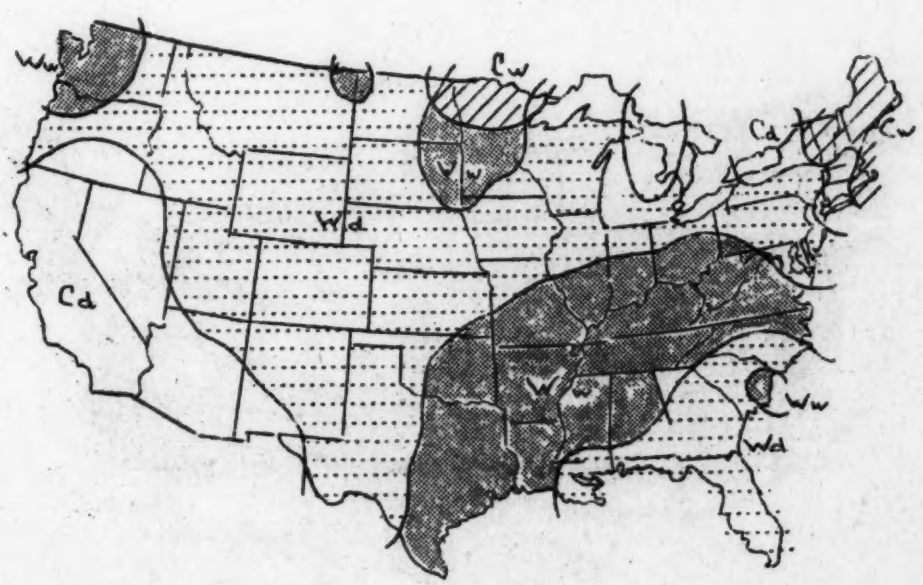

Figure 1. Weather of February, 1946. For explanation see above.

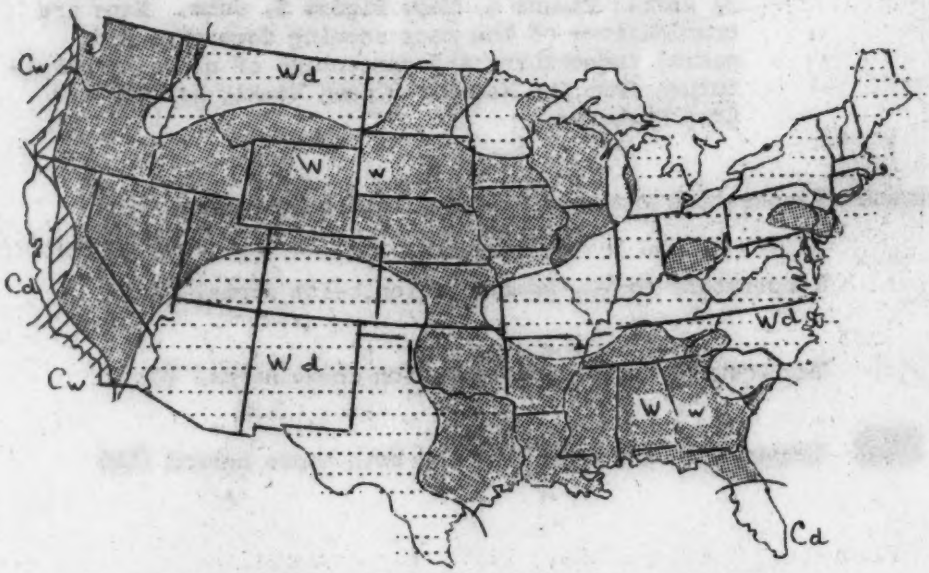

Figure 2. Weather of March, 1946. For explanation see page 271.

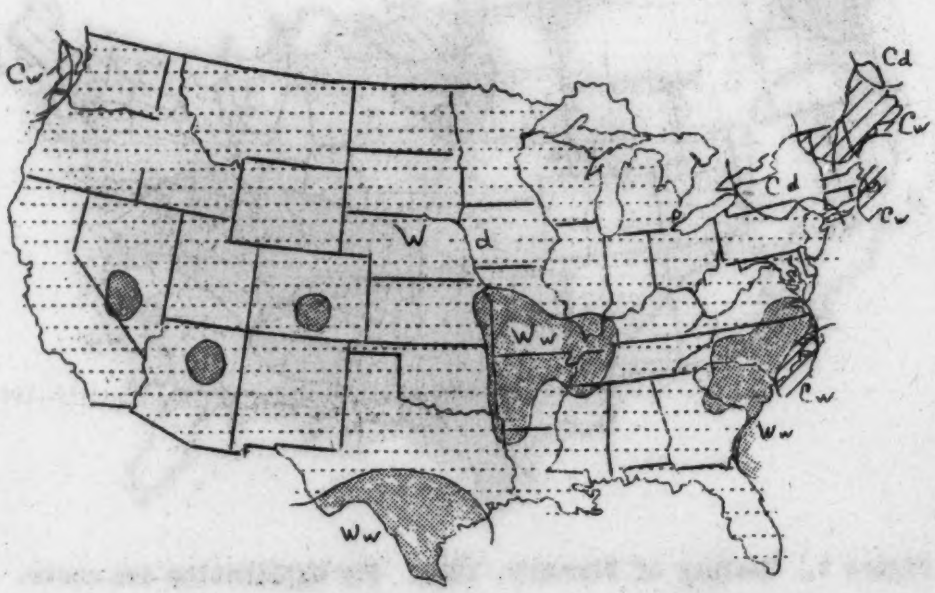

Figure 3. Weather of April, 1946. For explanation see page 271.

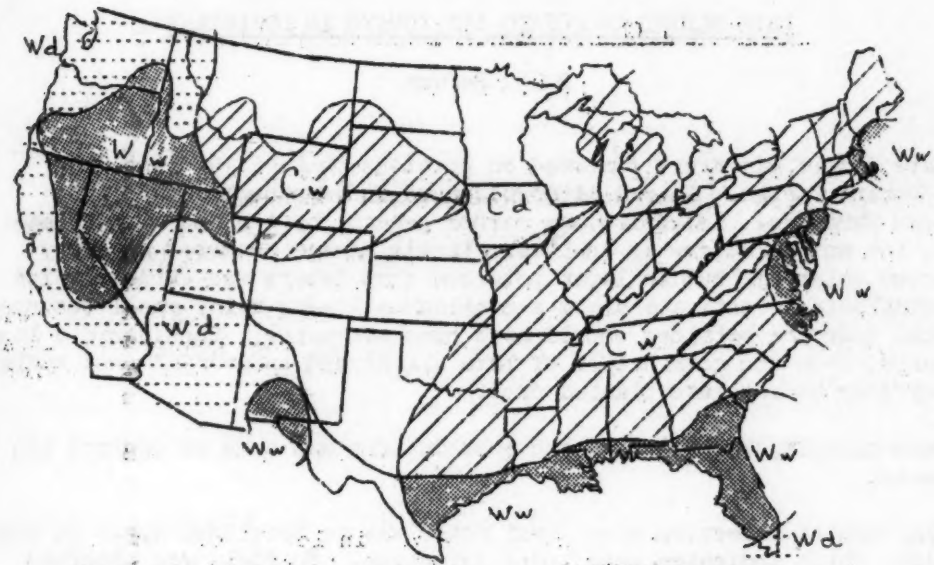

Figure 4. Weather of May, 1946. For explanation see page 271.

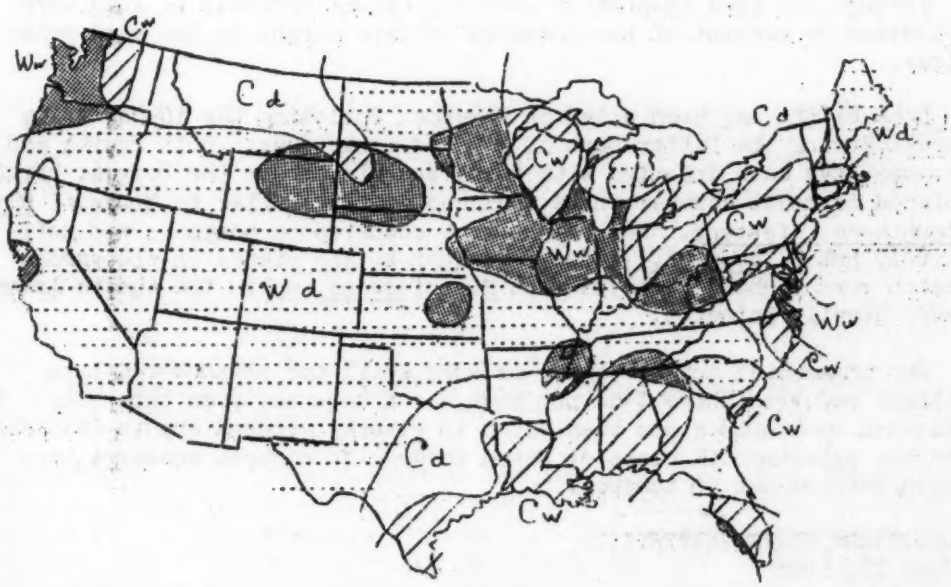

Figure 5. Weather of June, 1946. For explanation see page 271.

LATE BLIGHT ON POTATO AND TOMATO IN LOUISIANA

L. H. Person

Late blight was first observed on potatoes on April 9, 1946, in La Fourche Parish. It was later observed in Terrebonne and Pointe Coupee Parishes. Infection was rather general by the end of the season, but not so severe as in 1944. Little damage occurred on early planted potatoes, but on later potatoes some damage was evident which is difficult to estimate since a continuous 10-day rainy spell occurred at the time the potatoes should have been harvested. Considerable loss occurred from the combination of late blight and unfavorable wet weather conditions on the late planted crop.

Some spraying with Dithane and some dusting was done to control the disease.

The initial infection when first noted was in localized spots in the fields, which indicates seed-borne infection. No field was observed early in the season, April 9 to 15, in which general infection was noted.

Through our seed inspection service, eleven carloads of seed were rejected on account of the presence of late blight in the seed potatoes.

Late blight has been noted on tomatoes following the 10-day rainy spell during the latter part of May and early June. Both fruits and leaves have been infected with heavy sporulation on the leaves. Fruits placed in moist chambers have produced spores similar to those of Phytophthora infestans. The blight that occurred on tomatoes was definitely not P. capsici. A few volunteer potato plants in one garden patch were lightly infected with P. infestans, while the tomato leaves were heavily infected.

Our commercial tomato region is very small and whether the late blight occurred there I do not know, as I have not seen this area. The disease on tomatoes has been noted in several gardens and in test fields on the experimental plots at Baton Rouge. No control measures have been carried out on tomatoes.

LOUISIANA STATE UNIVERSITY
June 20, 1946

LATE BLIGHT ON POTATO IN MISSISSIPPI

John T. Presley

Late blight occurs on potatoes and tomatoes early in the season in Mississippi. So far as our observations go, late blight caused some damage to garden plots of potatoes in the southern part of the State during May.

We have not noted any outbreaks of late blight on tomatoes.

So far as I know, very little control measures are being practiced either on potatoes or tomatoes in this State. It is quite possible that the original source of infection was farther south, perhaps in Louisiana or Texas, and wind borne inoculum could have traveled as far north as southern Mississippi by the time the disease was noted in that area.

MISSISSIPPI AGRICULTURAL EXPERIMENT STATION
June 21, 1946

LATE BLIGHT ON POTATOES AND TOMATOES IN ALABAMA IN 1946

Coyt Wilson

The first report of late blight in Alabama in 1946 was on March 25, when blighted potatoes were found in the southern part of Baldwin County, approximately 40 miles southeast of Mobile. The disease spread slowly and did not reach epidemic proportions until the last two weeks of May.

By this time most of the potatoes had been harvested, but the commercial plantings of early tomatoes were just reaching maturity. John Bagby, Extension Specialist in Fruit and Vegetable Marketing, estimates that 75 percent of the tomatoes in Houston County (extreme southeastern corner of Alabama) was destroyed by late blight. Tomatoes in home gardens as well as commercial plantings were heavily damaged throughout the southern half of Alabama.

Weather played an important part in the epidemic that swept through the State. While the April and May rainfall records given in the table below are for Auburn, they are representive for the southern half of the State. The total precipitation for April was 1.88 inches below normal, and there was no rain the first 10 days of the month. Undoubtedly this was largely responsible for the slow spread of the disease after its first appearance in late March.

In May, however, total precipitation was almost double normal rainfall. During the latter part of April Phytophthora infestans was disseminated over large areas of Alabama, and scattered infections could be found in most potato fields by the time they were harvested early in May. Thus, the inoculum from the potatoes reached the tomatoes and May provided the necessary environmental conditions for an epidemic.

Most Alabama potato growers, realizing the danger of late blight from previous experiences, started dusting or spraying during the latter part of March. Very few people were equipped to spray properly, and most of the growers followed a dusting program using one of the copper dusts. Almost all of those who sprayed used Dithane. Some dusting was done by airplanes.

It was not possible to evaluate the efficiency of the different methods. All of them appeared to be effective under the conditions that prevailed this year. Quite a few growers hold the opinion that the widespread use of dusts or sprays helped to prevent an epidemic on potatoes. This may have been true in the southern part of Baldwin County, since those fields on which no control measures were practiced suffered considerable damage from late blight. But farther north where lower humidities prevail the dry weather probably should be given more credit for the control than the dusting or spraying.

Rainfall at Auburn, Alabama, during April and May, 1946

Date	Precipitation (Inches)	Date	Precipitation (Inches)
April 11	0.18	May 2	0.28
April 12	0.27	May 7	0.02
April 16	1.07	May 8	0.17
April 18	0.01	May 12	0.96
April 24	0.76	May 14	0.57
April 25	0.30	May 15	1.93
Total	2.59	May 16	0.28
Deviation -1.88		May 17	0.06
		May 18	0.59
		May 20	3.38
		May 21	0.02
		May 25	0.20
		Total	8.46
		Deviation +4.12	

Tomato growers of south Alabama were caught unprepared. A few of the growers were attempting to spray with Bordeaux, using small compressed-air sprayers. After the epidemic was well underway in southern Alabama, most people attempted to start a dusting program using a dust containing 5 percent metallic copper. Small hand or knapsack dusters were used and only fair success was obtained. The first picking was lost in practically all fields and in many instances the entire crop was lost.

The commercial tomatoes of north Alabama are set in the field about the time those in south Alabama are harvested. However, early plantings are made for home use. Late blight is already present in at least half of the gardens of north Alabama. There is every reason to expect an epidemic of late blight on these late tomatoes if the weather is favorable for its development and spread. Growers have been warned and the majority of them are making preparations to dust. However, they have no power dusters and unless the weather cooperates, they are likely to be only partially successful.

Lack of suitable power spraying or dusting machines is a serious handicap to the development of a satisfactory spraying or dusting program for tomatoes in Alabama. Most of the tomatoes are tied to stakes to keep the fruit and vines off the ground. The height of the stakes makes the use of power-driven machinery impractical. If late blight should continue to be a serious problem, the method of planting and handling will have to be changed or portable power units will have to be designed.

All available evidence indicates that the original source of infection was diseased potato seed. All of the first infections were found in fields planted with seed known to contain blight. It appears, though, that wind was responsible for dispersing the inoculum from these infection centers to adjacent fields. The maximum distance over which viable inoculum was moved by wind is not known, but infections have been found in tomato fields located a full mile from any potatoes.

ALABAMA AGRICULTURAL EXPERIMENT STATION

LATE BLIGHT ON TOMATO AND POTATO IN TENNESSEE

J. O. Andes

Late blight on tomatoes was widespread and the damage severe. Inasmuch as there is no way of determining what the losses are in gardens, no estimate is made. On the field crop in West Tennessee reports are from total loss to slight damage. Control measures are nil because spraying for tomatoes has not been demonstrated conclusively as prof-

itable here. Late blight is sporadic and any control measures must be designed to take care of the major problems aside from this one and at the same time give protection if blight should strike. Under the present situation I think the growers will be receptive to a control program, and I am now in a position to try it out.

The disease was noted quite early in the season when the plants were just being set out. My guess as to the original source of infection is that the fungus is indigenous, because it spread over a wide area and on several solanaceous plants.

Late blight on potatoes coupled with black leg was disastrous this year. The few people that used a thorough spray program have had no trouble, although adjacent fields were ruined.

UNIVERSITY OF TENNESSEE
June 20, 1946

SUMMARY OF LATE BLIGHT ON TOMATOES IN GEORGIA

Julian H. Miller

Following a survey in the middle of May [in P.D.R. 30, no. 7, July 15], in Tatnall County, the center of the green pack area in south Georgia, the writer made a second inspection June 4-5. In the interim the weather had changed to dry and hot long enough to check the late blight somewhat. About 15 fields planted in home-grown plants, and only slightly infected in May, were now producing some tomatoes free of spots, but nearly all of the early plantings from Florida plants were lost. Loss of crop was estimated at 75 percent by the county agents, market master, and others. This was not only in fruit loss. The average price last year was above $3.00 per bushel, while the few tomatoes that were sold this year brought between $.75 and $1.50 after the second day of the market openings.

Only a few farmers attempted sprays. Spraying of tomatoes has never been practiced here, and there was almost no spray machinery or materials to be had. Four farmers had sprayed with Bordeaux, one four times and the rest one spray each. The results were not satisfactory. In the first field there were apparently fewer fruit infections, but the leaves looked about the same as in unsprayed fields.

On this trip the writer examined the remnants of fields of young plants for the northern shipping trade, and they were also heavily infected with this blight. It will be interesting to see how much of this has been carried over into northern canner fields in New Jersey, Indiana, etc.

There are no large commercial potato plantings in this Tatnall area, but all small home patches examined on this trip were infected.

UNIVERSITY OF GEORGIA
June 20, 1946

LATE BLIGHT ON POTATO AND TOMATO IN GEORGIA

B. B. Higgins

We have not been able to make a systematic survey to determine the loss from late blight damage to the potato and tomato crops in Georgia. During the past two months numerous letters and inquiries in regard to the disease have been received. The first inquiries were received from residents of the southeast Georgia Coastal Plain, and practically all indicated serious damage to both potato and tomato.

On the morning of May 25, following several days of heavy rains and cloudy, cool weather, I noticed late blight in my own garden in Griffin. The disease was already prevalent and the conidia and conidiophores so abundant as to be conspicuous on the foliage even at some distance. At the same time a few spots were found on tomatoes. Both were dusted with a copper dust that afternoon and the dusting repeated a week later. This, with a period of hot sunny days beginning the second week of June, has halted development of the disease on the tomatoes, but the potato foliage was almost completely dead within a week after the disease was first noticed. Damage amounted to about 50 percent of the crop.

This is the first time I have seen this disease in the Piedmont section of Georgia during the 32 years I have been at this Station. Undoubtedly the continuous cool weather with frequent rains and cloudy days, continuing into June, is responsible for the unusual spread of the disease (from Florida potato section ?).

In the coastal plain region of the State a considerable acreage of tomatoes is planted for early market. Reports indicate heavy losses in these fields. Experiment Station men on a tour of that region last week reported that every field of tomatoes seen appeared to be almost completely defoliated by the disease. A newspaper report stated that 75 percent of the crop was lost.

The commercial early potato crop in Georgia is small and localized near the coast and I have no information as to damage to this crop.

GEORGIA AGRICULTURAL EXPERIMENT STATION
June 25, 1946

TOMATO AND POTATO LATE BLIGHT IN SOUTH CAROLINA, 1946

William M. Epps

Tomato late blight, caused by the fungus Phytophthora infestans (Mont.) De By., has been very serious in all of South Carolina's commercial tomato-producing areas in 1946.

In general, the potato crop was not injured by late blight. A few isolated lesions were found in a field of Katahdin potatoes on Edisto Island in Charleston County on April 29. Subsequent spread of the disease was slow, but by the middle of May some blight was present in most of the potato fields in Charleston County. Since the crop was being harvested at the time blight appeared, little or no reduction in potato yields resulted. Late blight tuber rot was observed only on an occasional tuber. Damage from this source was negligible; however, inspection reports from terminal markets revealed the presence of late blight rot in a few cars of Charleston County potatoes.

Late blight was discovered in the tomato breeding plots at the Truck Experiment Station at Charleston May 18, four days after it was first observed in an adjacent potato field. Within the following ten days, specimens were received from Charleston, Beaufort, Colleton, and Orangeburg Counties. In these areas the epiphytotic reached its peak about June 4. About June 1 the disease appeared abundantly in Dillon County. A survey in Dillon County tomato fields on May 25 had revealed only a few widely separated single lesions. Soon after June 4 the occurrence of hot dry weather checked the spread of the disease almost completely in all affected areas.

Destruction of the crop was almost complete on many farms, particularly in Orangeburg and Beaufort Counties. In the test plots at the Truck Experiment Station about 85 percent of the early fruits were infected with late blight rot and discarded at picking or rotted after picking and before they could ripen. The later maturing fruits were not so seriously damaged by fruit rot, but were severely scalded by the sun after the plants were defoliated by late blight. It was estimated that the damage to the Experiment Station variety trials was in excess of 90 percent. In Dillon County the tomato market opened and then closed, since much of the early fruit sold showed late blight lesions upon arrival at its destination. It reopened after the disease was checked by the change in the weather. At least one large tomato farm in Charleston County escaped the blight entirely even through no fungicides were used.

A fixed copper dust with 6 percent metallic copper was recommended for control of the disease. In many instances, however, the pathogen had gained such a foothold that dusting was not recommended. Where the

dust was properly applied before the disease had become too serious, it was effective and satisfactory control was obtained.

It was apparent from the spread of the disease across the State from south to north that the sporangia were spread progressively by wind. It appears extremely unlikely that the disease was introduced on plants shipped into the area from other areas farther south. The appearance of blight in tomatoes closely followed its appearance in potatoes in the coastal counties of Charleston and Beaufort. No central foci of infection were found unless the infected field of potatoes on Edisto Island could be termed such a focus. This field probably represented only one stride in the spread of the pathogen across the State from south to north.

SOUTH CAROLINA TRUCK EXPERIMENT STATION
CHARLESTON, June 28, 1946

LATE BLIGHT ON POTATOES AND TOMATOES IN NORTH CAROLINA

WESTERN NORTH CAROLINA

By H. R. Garriss

Late blight is present on both potatoes and tomatoes in Henderson, Jackson, Macon and Clay Counties. The disease has already caused extensive defoliation of potatoes, especially those of the Cobbler variety. Late blight is general on tomatoes (mostly home garden plantings) but where it is present is causing extensive defoliation. In Mitchell County as of June 15 late blight was less widespread than in the areas south. Fixed copper dusts are being widely used on tomatoes.

Late blight is off to an earlier start this year than in 1945 when it almost completely destroyed the tomato crop of the entire area and caused heavy damage to potatoes.

TOMATOES -- EASTERN NORTH CAROLINA

By D. E. Ellis

On the basis of field observations and inquiries from county agents and growers it is evident that tomato late blight has occurred in widely scattered areas over most of the eastern part of North Carolina in both the Piedmont and the Coastal Plain. Severe damage seems to be limited, however, to a relatively small acreage of commercial plantings in Scotland and Sampson Counties. The epiphytotic was of

comparatively short duration and there has been practically no development and spread of the disease since about June 6 when warm weather set in. The appearance of late blight on tomatoes in Eastern North Carolina is very unusual.

POTATOES -- EASTERN NORTH CAROLINA

By J. H. Jensen

Late blight was present in epiphytotic form in Eastern North Carolina in 1945 but came too late to cause more than slight damage. In 1946 first evidences of the disease were noticed the second week in May. Continued cool weather and frequent rains permitted the build up of widespread infection throughout almost all of the commercial potato area by the first of June. Extensive acreages of potatoes were defoliated a week or 10 days before the usual digging date and considerable reduction of yield in some fields resulted. With the exception of a few growers no spraying or dusting control measures for this disease were practiced. Airplane dusting with copper dust in one area is reported to have been helpful and to have prevented excessive defoliation. Spraying with Bordeaux mixture and with Dithane has given some control for a few growers.

NORTH CAROLINA STATE COLLEGE

LATE BLIGHT ON POTATOES AND TOMATOES IN EASTERN VIRGINIA

Harold T. Cook

Potato vines badly affected with late blight were received from Northhampton County on the Eastern Shore on May 23. A survey on the Eastern Shore on May 24 showed that blight was generally present in small amounts in both Accomac and Northhampton Counties and that it was already causing considerable damage in spots in a few fields.

A badly blighted section of one farm was found in Princess Anne County on May 27, but only a trace of blight has been found in the rest of that county.

Blight was generally present in potato plantings in Nansemond and Norfolk Counties on May 28. It has continued to spread and do considerable damage in those counties. In one field in Norfolk County that appeared to be free of blight on May 22, the vines were entirely dead in some spots and other vines had lost at least half of their foliage one week later.

A survey of the tomato plantings on the Eastern Shore on June 11 showed that blight was present in nearly all fields, but that it had caused serious damage only in those adjacent to badly blighted potato plantings.

This is the first bad outbreak of late blight on potatoes of the early crop since 1938 and the first time that more than a trace has occurred on tomatoes.

The weather this season has been especially favorable for the development and spread of late blight. Rainfall since the middle of May has been considerably above normal and temperatures have been generally below normal.

Spraying with 4-4-50 Bordeaux mixture or dusting with 20-80 copper-lime dust was recommended for the control of blight on potatoes. Spraying or dusting with the same materials has been suggested for tomatoes, but has not been strongly advocated since the disease is expected to disappear when normal temperature and rainfall become prevalent.

The source of infection in the potato crop is probably diseased seed potatoes. Blighted potato fields appear to be the source of inoculum for tomatoes.

VIRGINIA TRUCK EXPERIMENT STATION
June 18, 1946

LATE BLIGHT ON POTATO IN WESTERN VIRGINIA

S. B. Fenne

Late blight first appeared on potatoes in the vicinity of Blacksburg on May 27. Since that time, a few additional cases have been recorded but no epiphytotic has developed here. Some home gardeners are dusting their potatoes with copper and DDT. I have not yet seen late blight on tomatoes nor had any reports of it.

VIRGINIA POLYTECHNIC INSTITUTE
June 17, 1946

LATE BLIGHT OF POTATOES AND TOMATOES ON THE EASTERN SHORE OF MARYLAND

C. E. Cox, R. A. Jehle, and M. W. Woods

On July 10 and 11 a survey was made of the late blight situation on potatoes and tomatoes in the three lower counties (Wicomico, Somerset and Worcester) of the Eastern Shore of Maryland.

For the most part potatoes were in blossom while tomato plants varied in size from field to field. In the later planted fields tomatoes were about a foot high and just beginning to bloom while in earlier plantings there were green fruits up to an inch and a half in diameter. In general the crown set of fruit was poor.

At least a trace of late blight (Phytophthora infestans) was found in practically every potato and tomato field visited. Up to 30 percent of the foliage was infected, with almost 100 percent of the plants showing some lesions in the most severely affected potato field inspected. The most severely affected tomato field showed up to 10 percent of the leaves involved with the majority of the plants showing some lesions. No lesions were observed on the green tomato fruits.

Late blight on potatoes was first observed by Dr. R. A. Jehle on June 4 near Pocomoke City in Worcester County. It is unusual for this disease to appear so early in the season. During the past 20 years, Dr. Jehle has observed it only once before in such proportions on the early potato crop. Late blight on tomates was first observed this year by Dr. W. F. Jeffers and County Agent J. P. Brown on June 6, in a planting near Salisbury in Wicomico County. Such an outbreak of late blight on tomatoes has never been observed before on the Eastern Shore of Maryland.

It is estimated that the potatoes have been infected for several weeks, possible as long as a month. Potatoes from home-grown seed were less severely affected than those from northern-grown seed even when planted together in the same field.

Every severely affected tomato field observed was located adjacent to a potato field. Tomatoes isolated from potato fields showed only traces of late blight. This would indicate that potatoes have served as the original source of infection. There was no indication that tomato plants were infected when they were planted.

Potato growers, for the most part, are equipped to spray or dust. It is customary for them to apply insecticides only on the early potato crop. Many of them will spray with Bordeaux Mixture-DDT dust or with copper-DDT dusts. Tomato growers do not spray or dust their crop

as a general practice and some do not own proper sprayers or dusters. Some of them will attempt to control late blight if it continues to spread with Dithane-zinc-lime sprays or with fixed copper sprays or dusts.

Losses on the potato crop are not expected to be great if growers delay harvest until the tops are dead and dry. Losses of tomatoes as a result of the late blight will depend upon weather conditions. If it becomes hot and relatively dry, it seems unlikely that late blight will spread. If it remains wet and cool, losses from defoliation and fruit rot will probably be severe.

UNIVERSITY OF MARYLAND
June 18, 1946

LATE BLIGHT IN DELAWARE

J. W. Heuberger

June 26: Late blight was found on one tomato plant in a victory garden on May 29. On June 5, 3 plants to one side of the original plant and 2 plants to the other side were found infected.

No late blight was found on a row of potatoes 6 feet away and paralleling the row of tomatoes. This row of Cobbler potatoes was planted exactly in the area occupied by a row of Dakota Red potatoes last fall. The Dakota Red potatoes last fall were killed early by late blight and the tubers were left in the ground over the winter. No late blight was found in the Cobbler potatoes in that area this spring until June 14. Late blight is now developing on the potatoes but has ceased development on the adjacent row of tomatoes.

The row of tomatoes contained southern grown plants and on checking other fields planted from the same shipment of southern plants I found one field that had 3 infected plants.

On further checking, I found that the field that had late blight and the row of tomatoes in the victory garden that had late blight were planted with plants from the same basket. Thus, the late blight must have come in on a few infected southern grown plants.

I have only found late blight on potatoes in one other location in the State, at Angola which is about 5 miles back from the ocean front. A 5-acre field was completely destroyed in this area. Adjacent fields show no infection.

During the past four weeks I have been in more than 50 tomato fields

and 30 potato fields, all over the State of Delaware, and have failed to find late blight except where indicated above.

The weather in Delaware is now quite hot and dry and we are anticipating no further trouble from late blight on tomatoes and potates.

On tomatoes, I am positive that the two cases can be traced to infection on southern grown plants. On potatoes, I feel certain that the infection can be traced to infected tubers.

July 6: Commencing Friday, June 28, we had torrential rains extending through July 2. In fact, on July 2 we had 4.35 inches of rain in the lower end of the State. The weather stayed cool during the rainy period and it is still cool. During the week of July 1, I resurveyed our tomato fields and found that late blight was present throughout the State. Infection has been found at as widely separated points as Newark, Delmar, and Selbyville. Most of the infection is primary, with some secondary infection. In the Selbyville area, however, secondary infection is so serious that little hope is held for saving the plants.

As the long-range weather forecast for July is considerable rainfall, subnormal temperatures, and subnormal sunshine, it is anticipated that late blight of tomatoes will be destructive in Delaware. We are recommending the use of Dithane plus zinc sulfate plus lime as first choice for control of this disease. Our second choice is fixed copper sprays or dusts. All of the infection in Delaware is leaf infection as our fruit has not yet sized up.

UNIVERSITY OF DELAWARE

LATE BLIGHT ON POTATO IN NEW JERSEY

C. M. Haenseler

Phytophthora (late blight) has been observed in several fields. One report from our Burlington County Agent states that the disease was very prevalent in one field in his county. Specimens sent in by him were confirmed as Phytophthora in our laboratory.

I inspected one field in Burlington County on June 17 and observed a trace of Phytophthora on the old leaves. The diagnosis was confirmed by laboratory examination.

A Middlesex County field in which late blight had caused almost total loss of crop in 1945 was carefully examined on June 14, 1946 and

no trace of the disease was found.

It may be concluded therefore that late blight is present on potatoes in New Jersey, but that at present the disease is of very little importance and apparently absent except in a very few exceptional fields.

I have examined several tomato fields for late blight and have failed to find it so far. We likewise have had no report of the disease from County Agent or other sources. Reports from representatives of a canning company state that the disease has been observed on tomatoes outside of New Jersey but that they had no reports as yet of its occurrence on any of this New Jersey acreage.

The potatoes are sprayed or dusted regularly with fungicide-insecticide mixtures but no specific measures have been taken against the late blight as such.

Our first report of late blight on potatoes in 1946 was June 7 from Burlington County.

The original source has not been proved but since the disease is not present in many fields where the crop was severely diseased last year diseased debris from the previous years crop does not appear to be the most probable source of inoculum.

Since these reports were made an additional report has been received of a field of potatoes in Burlington County severely infected with late blight.

NEW JERSERY AGRICULTURAL EXPERIMENT STATION
June 20, 1946

LATE BLIGHT ON POTATO AND TOMATO IN NEW YORK

Charles Chupp

Late blight occurred early on both the north and south fork of Long Island. It was present before the middle of June. An interesting thing about its occurrence happened this season. In the past, the growers did not treat potato seed before planting. Consequently, any culls or tubers that were thrown out were fed to livestock. This year, after Dr. Cunningham had found that seed treatment reduced seed-piece decay, nearly all the potatoes were treated. Consequently, the culls could not be fed to stock and so were put into cull piles. The late blight fungus was found fruiting on such piles on the east end of the Island.

The tomato plants sent from the South also were affected by the potato late blight fungus. A few shipments showed a large percentage of these plants injured, and in at least one case, 125 acres of crop had to be plowed under. One shipment of plants was suspected of being affected by Phytophthora infestans, but when scrapings were made and placed under the microscope, it was found that the fungus was Phytophthora terrestris rather than Phytophthora infestans. The weather is cold and wet so that we shall be interested in watching the further development of blight in fields planted from such seedlings.

NEW YORK STATE COLLEGE OF AGRICULTURE, ITHACA
June 21, 1946

LATE BLIGHT ON TOMATO IN NEW YORK

Otto A. Reinking and W. T. Schroeder

The disease was first noted on seedling plants shipped from the South which arrived in Geneva on May 23, 1946. The disease was present before the plants were set out in the field. Plants sent in from a western State did not have the disease. We only have noted the disease on plants shipped into the State from outside sources. It would appear that the original source of infection in this instance was in the South on seedling plants. A large acreage of tomato plants was plowed under because of injury to the plants by the fungus. This was the only control practiced.

In the past years, we have had downy mildew on tomato plants and fruit in the field. This disease usually appeared late in the season, was a local infection, and was easily controlled by spraying with various copper sprays.

A study of the fungus on the plants sent in from the South showed it undoubtedly to be Phytophthora infestans. Further studies are being made of the fungus. It was easily transmitted to healthy plants where it produced a severe blight.

NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, GENEVA
June 20, 1946

LATE BLIGHT ON TOMATO AND POTATO IN PENNSYLVANIA

R. S. Kirby

Late blight has occurred on both tomato and potato. On tomatoes, it is severe in practically every important tomato-growing section. It has spread rapidly in the field from plant to plant and has caused many growers to replant their fields several times. In a number of cases, entire fields have been plowed down. In Schuylkill County, over 700 acres of tomatoes have been plowed down that were killed with blight and in many other counties hundreds of thousands of plants were lost. The disease kills the tomato plants in the field. In a number of cases it has even caused rot of fruit just beginning to form.

On potatoes, Dr. O. D. Burke first found late blight on sprouts on a cull pile. Later blight was observed spreading from infected tomato fields to potato fields.

Spraying with fixed coppers or Bordeaux, or dusting with fixed copper dusts, is being advised to control the disease.

The disease was first found on tomatoes on May 21 in Columbia County. Since that time, it has been found in at least 20 additional counties in all parts of the State.

On potatoes, late blight was first found on July 8.

On tomatoes, late blight apparently came in with the plants from the South. Surveys in many fields indicate that at the start there was no blight on home-grown tomatoes but where home-grown tomato plants were planted close to Southern plants, blight infected the home-grown plants.

On potatoes, the first blight was found on a cull pile but later there were many instances where late blight spread from infected tomato fields to potato fields.

PENNSYLVANIA STATE COLLEGE
June 18, 1946

LATE BLIGHT ON POTATO IN WEST VIRGINIA

H. L. Barnett

The following information on the late blight situation in West Virginia has been furnished by Mr. C. F. Bishop, Extension Pathologist.

Late blight on potatoes is now widespread in West Virginia, being first reported this season at Alpena on June 13. This is the earliest date on record for the appearance of late blight in the State. Since

that date it has been reported from nearly every county in the central mountainous region of the State and has already reached epiphytotic proportions. Cobblers, which ordinarily escape heavy damage, are already severely infected and there are definite indications that the early varieties will suffer considerable loss.

The usual recommendations have been Bordeaux, fixed coppers, and Dithane. The evidence indicates that the initial sources of inoculum are cull piles and volunteer potatoes in the field and garden.

No late blight on tomatoes has been reported at this date. However, conditions are favorable, and since it was severe in the mountainous regions of the State last year, there is every reason to expect that it will cause equal damage this season.

WEST VIRGINIA UNIVERSITY
June 25, 1946

LATE BLIGHT ON POTATO AND TOMATO IN OHIO

H. C. Young

Late blight first appeared on potatoes May 31 in the Marietta section. It is still prevalent but has not become serious even on untreated plots. The source of initial infection has not been determined except to state that the disease occurs every season, being more prevalent when May and June are wet and cool. It seldom causes an appreciable loss in this section.

Most southern tomato plants that we observed that came to Ohio after May 20 contained late blight. We began inspecting fields June 1 and by June 10 from 15 percent to 20 percent of the fields had to be reset. From 50 percent to 60 percent of the fields were spot reset. This, in many cases, has been repeated three and four times.

There are something over 30,000 acres of tomatoes grown for canning in Ohio. About 10,000 were set to locally grown greenhouse plants and by direct seeding. To date (June 20), late blight has not appeared on home-grown or direct seeded plants even though the weather has been wet and cool. Secondary lesions were noted on our June 10 inspection on shipped-in set plants. Georgia plants that were sent in before May 20 have shown little or no infection. Plants coming in from States north of the Georgia region are also showing late blight.

OHIO AGRICULTURAL EXPERIMENT STATION, WOOSTER
June 21, 1946

LATE BLIGHT ON TOMATO IN OHIO

T. H. King

So far the disease has been found and identified by us as being present in two counties. The disease was first noticed in Ottawa County on May 29, and in Washington County on June 26. However, it is possible that it is present in other parts of the State.

As far as I know the disease has occurred only on tomatoes so far. On the tomato plants from Washington County the disease is present on the plants that were grown locally, while in Ottawa County it was found on tomato plants that had been shipped from the South.

Control measures for the use of Bordeaux mixture, or fixed copper have been recommended to the growers.

OHIO STATE UNIVERSITY
June 27, 1946

LATE BLIGHT ON TOMATO AND POTATO IN INDIANA

R. W. Samson

I first identified late blight on incoming tomato plants from southern Georgia and western Tennessee on May 26. These plants were from unopened shipping containers collected from Indiana canners on May 23 and probably left the points of origin on or before May 20. The disease was subsequently noted on plants taken directly from shipping containers as received from Mississippi and southern Illinois. It was likewise identified on a small sample of plants submitted by an Indiana canner and originating in Virginia.

With one exception, no late blight has been found to date on tomato plants in Indiana direct-seeded fields or local plant beds and fields. The exception is the discovery of extensive late blight in direct seeding immediately adjacent to a field set early with southern-grown plants in which late blight was earlier noted.

Occasional to very numerous late blight stem cankers have been found in all fields examined that were set with plants from these southern sources. Some stands were almost totally destroyed by such infection. No estimate has yet been made of the general extent of such stand damage. Some secondary infections, appearing as well-developed leaf lesions, have already been noted in fields set early with southern-grown plants.

The advanced development of stem cankers in many fields indicates that late blight was present on tomato plants received from the South as early as May 3. At present, it seems safe to say that late blight infections are present in all Indiana tomato fields set entirely or partially with southern plants. To what extent these infections will harbor the fungus until abundant foliage growth provides humidity chambers to incubate a serious epidemic later remains to be seen. Late blight probably cut the Indiana canning tomato yield by at least 100,000 tons last year, the first year in which we have any record of the disease occurring on tomatoes in the State. It now seems more than probable that the disease was introduced on southern-grown plants last year, as the writer suggested but did not verify (PDR 29: 674-675. 1945).

A severe outbreak of late blight was discovered during the first week in June on fruiting tomatoes in a local greenhouse that had been poorly heated and ventilated. Infection is presumed to have come from a fall crop grown in the same house.

Late blight has been reported on very early potatoes in eastern and southern Indiana, with extensive damage in the latter section. Weather has been particularly favorable for both early, luxuriant development of potatoes and for late blight in those sections. Late blight has not yet been found in advanced early potato plantings in central Indiana where many of the blight-infested canning tomato fields are located that were set with southern plants.

The evidence is quite conclusive that the late blight now present in Indiana tomato fields set with southern plants was introduced on the plants.

Large-scale potato growers in Indiana are adequately equipped with spray machinery and experienced in its use. Home market gardeners are generally without suitable equipment to apply fungicides for blight control. Growers of cannery tomatoes are in a similar position. If a blight epidemic should threaten later, extensive use may be made of fungicides applied from airplanes to canning tomatoes. This method of application did not give any outstanding control of late blight in Indiana in 1945, possibly because applications were made too late.

In many instances where stands of tomatoes have not been seriously reduced by late blight, missing plants are being replaced with locally-grown plants. Some fields too severely damaged to warrant resetting by hand are being entirely replanted to tomatoes. A few would-be tomato growers have turned to corn or soybeans, after becoming aware of late blight, either abandoning infected acreage already set or not setting any more tomatoes.

PURDUE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION, LAFAYETTE
June 19, 1946

LATE BLIGHT IN SOUTHERN ILLINOIS

G. H. Boewe

So far, I have only examined potatoes and tomatoes in the southern third of Illinois.

Late Blight of Potatoes and Tomatoes in Southern Illinois, June 4-7, 1946

County	Size of Planting	Variety	Prevalence	Intensity
		Potato		
	acres			
Clark	1/4	Cobbler	0	
Gallatin	1/4	"	0	
Jackson	1	"	0	
Madison	8	"	100	Severe on leaves
"	6	"	100	Very severe on leaves
"	5	"	0	
Monroe	1	"	0	
"	10	"	0	
Pulaski	1/10	"	0	
"	1/8	"	100	Severe on leaves
"	1/8	"	100	" " "
"	10	"	90	35% of leaves
"	25	"	100	67% of leaves
Randolph	1	"	0	
Richland	1/8	"	1	Very light on leaves
Union	1	"	35	7% of leaves
Wabash	1/4	"	0	
		Tomato		
	plants			
Monroe	8,000	Rutgers	0	
"	4,000	"	100	30% of leaves
Pulaski	7,500	Bonny Best	Trace	(1% in small area in field)
"	1,800	" "	30	5% leaves, Tr.fruit
"	2,000	Earliana	100	Light on leaves
"	2,500	Bonny Best	100	Severe on leaves
"	4,000	" "	100	" " "

(Severe on green fruits on severely diseased plants in last two fields)

Late blight has been found on both potatoes and tomatoes in southern Illinois. I examined one planting of potatoes in each of the following counties: Clark, Wabash, Gallatin, Jackson and Randolph, and two plantings in Monroe, but found no late blight. Five plantings of potatoes were examined in Pulaski County and only one was free of late blight. In Madison County two plantings examined had 100 percent late blight infection and in one planting no blight was observed.

Late blight was observed on tomato plants set in the field and on plants in plant fields in Pulaski and Monroe Counties. Two fields of tomatoes (last two in table) in Pulaski County had 100 percent of the plants diseased and a large area in each field where the plants were severely infected, with cankers on branches and leaf petioles and the leaves mostly dead. Another planting had 30 percent of the plants with 5 percent of their leaves infected. Only three severely diseased plants were observed in this field. Another planting which was set out two weeks later than the above fields had 1 percent of the plants infected in a small area of the field.

Some of the largest potato growers have sprayed with Bordeaux or fixed copper but most growers have used no sprays or dusts. One tomato grower sprayed with Bordeaux (10-10-100) about 10 days before I saw the planting on June 6, 1946. He had noticeably checked the spread of the disease.

I saw the first authentic specimen of late blight on potato May 28. However, from the description given of leaf spot present on potatoes in Madison County on May 8, I believe the disease was present at that time. In Pulaski County the disease probably appeared as early as May 8 or possibly earlier. In some of the potato fields, infection probably came in with the seed. In the case of tomatoes in Pulaski and Monroe Counties the source of infection is not known. The Pulaski County growers bought certified seed and grew their own plants in hot beds. Some of the tomato plants that I saw were blighted worse than any of the potatoes in this area.

ILLINOIS STATE NATURAL HISTORY SURVEY DIVISION
June 18, 1946

LATE BLIGHT ON POTATO AND TOMATO IN ILLINOIS

M. B. Linn

A special release was sent to all Farm Advisers by the writer on May 20 warning them that conditions were favorable for potato late blight. On May 23 a radio talk was given on this subject over the University of Illinois Station WILL. On June 5 Illinois Farm Flash

No. 45 was sent to thirty-five radio stations in Illinois, Missouri, Kentucky, Indiana and elsewhere. So, all in all, we have given a considerable amount of publicity to late blight and its control. The Farm Adviser release and WILL talk were given before we knew that late blight was actually present in the State. We based our warning on cool temperatures and wet weather during May which were remarkably like those in May of 1945 when we had a less severe outbreak.

Although late blight was first reported on tomatoes, it is my belief that the disease developed first on garden plantings of potatoes and the spores were carried to tomatoes. We have no proof of this at all and no special effort has been made to trace outbreaks to the original source. So far as we know there were no importations of tomato plants into the areas where late blight first appeared -- at least not until after the disease was well established.

UNIVERSITY OF ILLINOIS
June 19, 1946

SOME BRIEF REPORTS OF OCCURRENCE ON POTATO

MAINE:

By Donald Folsom

In central and northern Maine tomatoes have been set out in the gardens for only a week or two. During the past two years all tomatoes were killed down by a frost on June 9th or 10th.

However, in Aroostook County, potato late blight was found on potato by Dr. E. S. Schultz on June 2; three dump piles were examined of which two were found to be producing late blight. According to Dr. Reiner Bonde the Aroostook County County Agent used this information for radio broadcasts and cull piles are being eradicated. At the last session of the legislature, or perhaps the one before that, a law was passed against potato dump piles but apparently the law is not enforced.
MAINE AGRICULTURAL EXPERIMENT STATION
June 18, 1946

WISCONSIN:

By R. E. Vaughan

Potato late blight fungus was found in good fruiting condition on volunteer potato plants from a discard pile in Waushara County, Wis-

consin on June 20. It has not been found in any field up to the present time. Steps are being taken to inform our county agents of the presence of late blight.
UNIVERSITY OF WISCONSIN
June 22, 1946

CALIFORNIA:

By M. W. Gardner

In the Colma market garden region, which I visited June 18, potatoes -- mainly Bliss -- have been grown more generally than usual and are now being harvested. These are grown under overhead sprinkler irrigation and this has resulted in considerable late blight infection, even though most growers sprayed with Bordeaux. There is also abundant infection on the common weed in the potato patches, Solanum sarachoides.
UNIVERSITY OF CALIFORNIA
June 19, 1946